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(54) Valved container closure.

(57) A container closure lid (8) having a valved spout (9) is disclosed. The valve (V) is normally closed so as to prevent spillage from the container. In use, the valve (V) is opened by the application of force laterally to the edge of the valve. In addition, a valved spout which is particularly adapted to permit close stacking of the lids is disclosed.

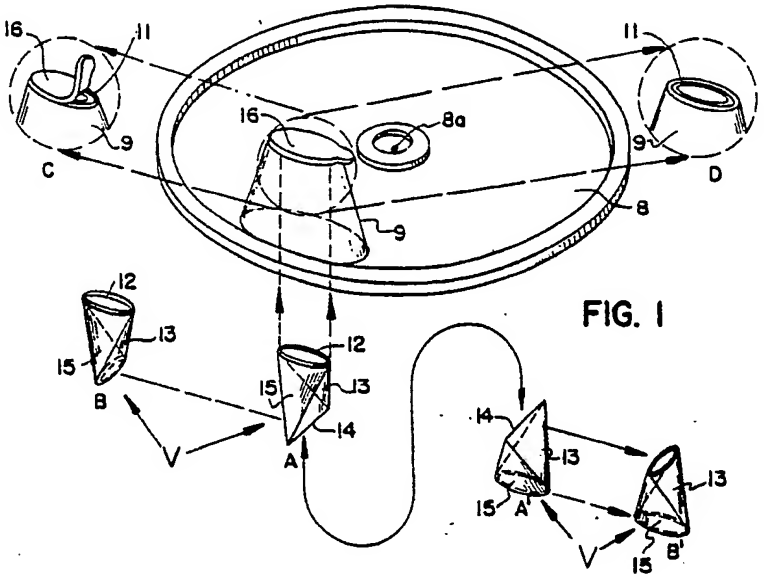

FIG. 1

EP 0 326 743 A2

VALVED CONTAINER CLOSURE

This invention relates to a closure for a container and is particularly concerned with containers as employed in the so-called fast food industries. Containers of this type are commonly provided with a cup or body and a closure lid. In some arrangements, it is contemplated to remove and discard the lid when access is desired to the food or other material to be supplied in the container. In some instances, a container lid is employed having a deflectable or removable area adapted to be used either directly for drinking or adapted to be opened for insertion of a drinking straw.

In general, prior art arrangements of the kind referred to are not adapted to be reclosed or resealed after they have been opened for use; and in consequence, in the absence of exercise of special handling care, the liquid or material in the container is subject to being inadvertently spilled after the original closure is deflected or disturbed.

It is a major objective of the present invention to provide a closure for a container, particularly adapted to handle liquids, and in which a drinking spout is provided, the drinking spout not only having an aperture for withdrawal of the contained liquid, but also having a valve therein adapted to close when the liquid is not being withdrawn through the spout.

It is a further object of the present invention to provide an arrangement of the kind above referred to in which the valve in the spout is operable by engagement of the lips of the user with the exterior of the spout, thereby providing for automatic opening of the spout when the user desires to withdraw liquid from the container through the spout, and also providing for automatic closing of the valve in the spout when the lips of the user are again separated from the spout.

In addition to the foregoing, it is a further objective of the invention to provide an initial closure tab associated with the spout in relation to the valve so that for purposes of shipment and handling, the closed container will remain substantially sealed until the closure tab is intentionally removed.

It is a further object of the invention to provide a closure which is configured in such a manner as to permit stacking of complementary closures in an array.

How the foregoing objects and advantages are attained will appear more fully in the following description of the drawings, in which:

Figure 1 is an overall perspective view of a lid or closure or container according to the present invention, the lid having a spout adapted to surround or house a control valve, the valve being illustrated in Figure 1 in separated relation to the lid in several positions below the illustration of the lid itself, as will be explained more fully hereinafter.

Figure 2 is a fragmentary sectional view of the upper portion of a cup having a closure or lid according to the present invention, including the spout and the interior valve, this figure showing the valve in opened position, as a result of engagement of the lips of a user.

Figure 3 is a fragmentary view taken as indicated by the section line 3-3 applied to Figure 2, but showing the parts disengaged from a user and with the interior valve in closed position.

Figures 3A and 3B are sectional views taken as indicated by the sections lines A-A and B-B applied to Figure 3.

Figure 4 is a view similar to Figure 3 taken as indicated by the section line 3-3 applied to Figure 2, but Figure 4 shows the valve in opened condition.

Figures 4A and 4B are sectional views taken as indicated by the section lines A-A and B-B applied to Figure 4, these sectional views also showing the valve in opened condition.

Figures 5, 5A and 5B are views illustrating a modification of the arrangement shown in Figures 1-4, Figures 5A and 5B being taken as indicated by the section lines A-A and B-B applied to Figure 5 and showing the valve in closed position.

Figures 6, 6A and 6B are views of still another embodiment, the views again being similar to Figures 3, 3A and 3B, with the sectional views 6A and 6B being taken as indicated by the section lines A-A and B-B applied to Figure 6 and showing the valve in closed position.

Figure 7 is a perspective view of a closure according to the present invention which is particularly intended for use in closing a container by establishing a frictional fit with the internal container wall, the control valve is shown fragmented below the closure.

Figure 8 is a fragmentary section through the lines 8-8 of Figure 7.

Figure 9 is an illustrative fragmentary section through the lines 3-3 of Figure 8 and depicts multiple closures to illustrate the stacking feature thereof.

Figure 10 is a fragmentary top plan view of the closure as depicted in Figure 7.

Figure 11 is a perspective view of a closure according to the present invention having a modified valve and spout height which facilitates stacking of multiple complementary lids.

Figure 12 is a fragmentary section through the lines 12-12 of Figure 11.

Figure 13 is an illustrative fragmentary section through the lines 13-13 of Figure 12 illustrating stacking of the closure.

Figure 14 is a fragmentary top plan view of the closure depicted in Figure 11.

Figure 15 is a perspective view of a closure according to the present invention illustrating a modified valve arrangement which facilitates stacking.

Figure 16 is a fragmentary view through the lines 16-16 of Figure 15 illustrating the modified valve in a stacking arrangement.

Figure 17 is a fragmentary sectional view through the lines 17-17 illustrating a stacking arrangement.

Figure 18 is a fragmentary top plan view of the closure of figure 15.

Referring first to Figures 1 and 2, the container is indicated by the reference numeral 7, and the lid for the container is indicated at 8. The container may be formed of any desired material, quite commonly a sheet plastic or molded foamed plastic or paper or cardboard; and the lid may also similarly be formed of materials of the same type. In embodiments such as herein illustrated, in which the spout 9 is integrally molded or formed with the remainder of the lid 8, it is preferred that the material employed have the characteristics of sheet material having substantial flexibility and resiliency so that the spout may readily be compressed by the lips of the user, for the purposes fully described herebelow. As is customary with lids of the kind referred to for containers of the kind referred to, the lid ordinarily has a peripheral groove or socket 10 adapted to receive and interengage with the upper edge of the cup 7 itself.

The spout 9 is connected with the lid and the spout has a flow passage between the interior and the exterior of the cup; and preferably, this flow passage is of ovoid cross section and also of progressively reduced dimensions from the surface of the lid 8 upwardly to the delivery opening 11 (see the figure details indicated by the letters C and D associated with Figure 1).

Although the spout 9 and the lid may be separately formed or molded and then interconnected, they may also, as is disclosed in Figures 1-4, be integrally molded with the remaining structure of the lid.

With the foregoing description of the general arrangement of the lid and the spout in mind, attention is now directed to the four illustrations marked A, B, A′, and B′, these illustrations showing the interior control valve indicated generally by the letter V. This valve is positioned within the spout 9 but is shown in exploded relation to the spout in the illustrations marked A, B, A′ and B′. Certain details of the valve are also more fully disclosed in Figures 3, 3A, 3B, 4 4A and 4B.

The valve is preferably formed of flexible and resilient material, for example, synthetic rubber compositions. The valve has an upwardly presented opening of ovoid shape similar to the ovoid shape of the upper or delivery opening 12 of the spout 9 and fitting just inside of the delivery opening 11 of the spout. The valve further has tapered or inclined surfaces 13-13 (see also Figures 3 and 4) converging downwardly and meeting at the lower edge 14 of the valve, as will clearly appear from comparison of Figures A and A′ positioned below the main portion of Figure 1 and also shown in Figures 3 and 3B. The valve in opened position is shown in Figures B and B′ below the main portion of Figure 1.

The detail Figure A and A′ in the lower part of Figure 1 shows the valve when in the closed or "at rest" position. The valve is opened by application of lip pressure, as indicated by the arrows at the sides of Figures 4A, this lip pressure being communicated through the side walls of the spout 9, as clearly appears in Figure 2, and transmitted through the side walls to the walls 15 of the valve V, which lie between the converging walls 13. When this occurs, the side walls 13 of the valve separate from each other in the manner clearly shown in Figures 4, 4A and 4B, thereby opening the valve port along the lower edge of the valve and thus provide communication from the interior of the container upwardly through the spout 9. This provides for delivery of the liquid from the container upwardly through the valve and out of the delivery opening 12 of the valve and thus also out of the delivery opening 11 of the spout 9.

When the lip pressure is again released from the side walls of the spout, the converging walls 13 of the valve again move to close the opening along the line 14 at the lower end of the converging walls 13.

The automatic closure of the valve when the lip pressure is released is not only desirable in order to avoid leakage, but when handling heated liquids, is also advantageous in reducing heat loss of the contents of the container.

The foregoing alternate opening and closing of the valve, as a result of the action of the lips of the user, will be fully apparent from comparison of Figures 1, 2, 3, 3A, 3B, 4 4A and 4B.

The lid 8 is desirably provided with a very small aperture, for instance, in the central region, as indicated at 8a in Figures 1 and 2, thereby providing for ingress of air as the contents of the cup are being withdrawn through the valve, and thus prevent development of negative pressure within the cup during delivery of the liquid. An appropriate aperture for this purpose need only

have very small cross-sectional dimension and will, therefore, not even result in leakage of the liquid under any normal handling conditions.

In the embodiment of Figures 1-4, see particularly the detail indicated at the letter C of Figure 1, a separable tab 16 is initially provided in position overlying the delivery opening 11 of the spout 9, for the purpose of sealing the container for prepackaged products. This tab desirably has adhesive bonding and is readily manually removable in preparation for use of the container and the valved spout. This tab alternatively be molded or formed integrally with the spout wall, and arranged for manual separation from the body of the spout.

For effecting the feed operation above described, it is desirable that the spout 9 be formed of sheet material which has some flexibility, and preferably also some resilience so that it will return to the closed position when the lip pressure is released.

The sheet material employed for the valve used within the spout should also be flexible and resilient. This is important so that after opening of the valve by compression under the action of the lips of the user, and subsequent release of the lip engagement, the inclined valve walls 13, which meet along the lower edge 14 when the valve is closed, will return to the "closed" position. When the valve is opened by external pressure applied to the spout, the lower part of the walls 15 move toward each other so that the dimension in the direction of the line 14 is reduced and this causes opening of the valve.

The proportions of the valve itself, and also of the interior of the spout 9, are also configured so as to provide a peripheral sealing interengagement between the outer surface of the valve and the inner surface of the spout in the upper region of the spout and valve. This is important in order to avoid any tendency for leakage from the spout except when the valve is intentionally opened. In the specific embodiments as herein disclosed, it is contemplated that portions of the external surface of the valve itself such as the side walls 15 be adhesively bonded to the interior surface of the spout. With the configurations illustrated in the drawings, this is desirably effected throughout the height of the valve, i.e., throughout the height of the side walls 15. In this way, the rebound of the spout walls after separation of the lips serves to assure reclosing of the valve along the line 14.

As above indicated, the lid and the spout are desirably formed, as by molding, from sheet plastic material. The entire lid, including the spout, may be molded as a single unit or, if desired, the spout and the planar portion of the lid may be separately formed and then interconnected. In any event, the thickness of the material used in the spout should be on the order of from about .001" to .050", so that the spout may readily be compressed by forces produced by the lip engagement. Compression of the sides of the interior valve V is, of course, also required; and as above indicated, the valve material is desirably resilient, and the thickness of the material used for the valve may also lie within about the range of thickness above referred to for the spout wall.

The wall of the cup 7, on which the lid is employed, may be made of any of a wide variety of materials, one common material used for this purpose being foamed plastic. Material of this type is not only lightweight, but provides adequate strength and rigidity, as is well known.

In the alternative embodiment illustrated in Figures 5, 5A and 5B, the arrangement of the interior valve and the general configuration of the spout are similar to those described above in connection with the first embodiment. However, in the embodiment of Figures 5, 5A and 5B, the upper edge of the spout 9 is provided with an interned flange 9a overlying the upper open end of the valve V. This provides a flange surface for interengagement with the upper edge of the open end of the valve, which may be desirable with certain materials in order to stabilize the valve in the spout.

Another alternative for similar purposes is illustrated in Figures 6, 6A and 6B. In this embodiment, the upper edge of the valve is provided with laterally extending flanges 9b which overlie the upper edge of the spout 9; and this will provide a similar stabilizing action in the relation between the valve and the spout.

With reference to Figure 7, there is illustrated an alternative embodiment of the invention which is particularly intended to provide for improved stacking of multiple complementary closures in a top to bottom array. The closure 8 is depicted as having a peripheral groove 10 which is intended to establish a compression fit with the interior wall of the container. Except for the valve V, the embodiment of Figure 7 is very similar to the previously described embodiments.

In the present embodiment, the closure lid 8, spout 9 and valve V are all molded as a unitary structure, see Figures 8 and 9. For purposes of illustration, the valve V has been fragmented and dropped below the lid 8 in Figure 7. From this fragmentary view, it can be seen that the valve V has converging walls or opposed planar terminal portions 13 which converge at the lower edge or valve apex 14. This construction is similar with the prior embodiments.

In the present embodiment the side walls 15 of the valve V do not parallel the outer wall 20 of spout 9 as in prior embodiments, see Figure 9. Side walls 15 in this embodiment taper inwardly

from the outlet portion 24 of spout 9. The valve V and the spout 9 merge at the outlet end as indicated by 24 and form a common open end 26.

As can be seen from Figure 9, the present embodiment provides a tapered space between the inner surface 22 of spout 9 and side wall 15. Likewise, the length of the valve apex 14 is less than the related coplanar length of the outlet portion 24 of spout 9 and the valve end 28 will pass into the open end of a complementary spout beyond the merger portion 24.

With reference to Figure 8, it can be seen that the converging walls 13 of valve V are spaced from the inner surface 22 of spout 9.

As can be seen with reference to Figures 8 and 9, the present embodiment provides improved stacking of multiple complementary closures in an array which is better suited for packing and shipping of the closures. In stacking, the open end 26 of a first spout 9 will fit within the inlet 23 of the second spout 9. Likewise, the open end 26 will fit within the space defined between interior surface 22 and side walls 15. The valved end 28 then becomes nested within the spout of the closure immediately beneath it.

With reference to Figure 10, it can be seen that the present construction provides a valve which is tapered inwardly on all sides toward the lower edge or valve apex 14. Due to the integral nature of the spout and valve, the application of pressure to the spout 9 in the direction as indicated by the arrows in Figure 9 will be transmitted to the valve apex 14 and the valve will be open to permit dispensing of the fluid. In the event of accidental tipping of the container, the nesting of the spout about the valve V will provide further shock absorbency to avoid accidental opening of the spout. It will be understood by those skilled in the art that a force which is sufficient to dislodge the lid or to damage the seal between the closure and the container will still result in accidental fluid discharge.

With reference to Figure 11, there is illustrated an alternative embodiment of the invention which is particularly intended to provide for reduced valve size in the spout and to provide for some stacking of multiple complementary closures in a top to bottom array. The closure 8 is depicted as having a peripheral groove which is intended to fit about the rim of a container as discussed with previous embodiments. Except for the valve V, the embodiment of Figure 11 is very similar to the previously described embodiments.

In the present embodiment, the closure lid 8, spout 9 and the valve are all molded as a unitary structure, see Figures 12 and 13. For the purposes of illustration, the valve V has been fragmented and dropped below the lid 8 in Figure 11. From this fragmentary view, it can be seen that the valve V has converging walls or opposed planar terminal portions 13 which converge at the lower edge of valve apex 14. This construction is similar to those previously described, however, in the present embodiment the side walls, previously identified as 15, of the valve V have been eliminated and are replaced by the wall 20 of the spout 9.

With reference to Figures 12 and 13, it can be seen that the opposed planar terminal portions 13 taper inwardly toward the lower edge or valve apex 14 to produce the valve end 28. This is consistent with prior embodiments. However, in this embodiment, the merger at 24 coincides with open end 26. This effectively produces the inverted W instant cross section as shown in Figure 12. The arcuate portions of the ovoid shaped spout serve the function of the end walls 15 which have been eliminated by this construction.

With reference to Figure 13, it can be seen that the lower edge or valve apex 14 extends across the interior of the spout 9. Accordingly, efforts to stack closures according to this embodiment are limited by the abutment of open end 26 of a first spout against the valve end 28 of the prior spout.

As noted the instant section of the valved spout, shown in Figure 12, will appear as an inverted W with the opposed terminal portions converging at the apex thereof to form the valve apex. Since the valve apex extends across the spout, it will be the determining factor in controlling the degree of stacking. Accordingly, the valve apex 14 should be ideally placed as close to the open end 26 as is consistent with the resilience of the selected material.

Figure 14, a top plan view clearly shows the relationship of planes 13 with respect to the walls 20.

With respect to Figure 15, there is shown a further embodiment of the present invention which is particularly adapted for stacking. The closure 8 is similar to those previously described, however, the spout and valve arrangement is different. The spout and valve are of a unitary construction with the closure, as previously described, however, the spout has been modified by the addition of notch 30, see Figure 15. The sides of the notch 30 are defined by the converging planes 13 which define the terminal portions of the valve. As can be seen more clearly with reference to Figure 16, the valve in cross section resembles an inverted W shape. This is similar to the view of Figure 12, however, the present embodiment does not incorporate the arcuate portions of the spout. Accordingly, the external portions of the spout 9 generally define an inverted W shape. As with previous embodiments, the opposed planar terminal portions 13 converge at valve apex 14. As can be seen with reference to Figure 16, the modification of spout 9 so that the

outward configuration thereof parallels the configuration of the valve results in a condition of improved stacking of complementary lids. Likewise, the location of the valve immediately adjacent the free end of the spout provides the maximum stacking area beneath the valve.

As can be seen with reference to Figure 17, multiple closures may be stacked in the usual array. In practice, that portion of the closure which forms the peripheral groove 10 is generally pliable enough so that closures may be stacked in a nested fashion one upon the other. In such a condition, the apex 14 of the first valve would move into virtual abutment with the apex of the closure beneath it. Thus, the valved spout is comprised of a body portion which defines the spout exterior and valved portion which closes the spout.

As can be appreciated by comparing the various embodiments, the embodiment of Figures 15 through 18 provides the greatest degree of stackability. Since the ability to stack is improved, the overall height of the spout 9 is not as critical and the spout may be produced in a height sufficient to assure that the valve end 28 of the spout will easily reach into the user's mouth.

Claims

1. A valved spout for controlled dispensing of a liquid from a container, said spout comprised of outer and inner resilient members, said outer member having inlet and outlet ends and a body segment which defines the exterior of said spout and said inner member, positioned between said inlet and outlet ends of said outer member to control dispensing, having an open end positioned adjacent said outlet and a valved end extending toward said inlet, said valved end having opposed terminal portions which define an apex opened by application of force in a direction edgewise to said opposed terminal portions.

2. A stackable valved spout for controlled dispensing of a liquid from a container, said spout comprised of outer and inner resilient members, said outer member has a fixed and a free end and a body segment which is of decreasing size from the fixed end toward the free end and defines the exterior of said spout, said fixed end further has an interior open volume which is greater than the exterior volume of said free end and said inner member, positioned within the said outer member to control dispensing, has an open end positioned adjacent said free end and a valved end extending toward said fixed end, said valved end having opposed terminal portions which define an apex opened by application of force in a direction edgewise to said opposed terminal portions.

3. The valve of claim 2 wherein said valved end of the spout has a length less than the related coplanar length of the free end.

4. The valve of claim 2 wherein said free end has a notched, non-circular configuration and the valve has a parallel configuration and closes said free end.

5. A container closure for selectively dispensing a liquid, said closure comprising:
a lid portion for closing the container and defining the base of the closure;
a valved spout integral with said lid portion for dispensing liquid from the container, said valved spout further comprised of:
outer and inner resilient members nested one within the other;
said outer member defines the exterior of the spout and has a first end integral with said base and a second end for dispensing a liquid; and
said inner member controls dispensing and is positioned between the ends of said outer member with an open end positioned adjacent to said second end thereof and a valved end extending toward said first end thereof, said valved end having opposed terminal portions defining a valve apex opened by application of lateral compression in a direction edgewise to said opposed terminal portions.

6. The closure of claim 5 wherein the valved end of said inner member is receivable within the outlet end of a second like closure so that multiple complementary closures may be stacked in an array.

7. A controllable valve device for use in dispensing a liquid from a container, said device comprising two resilient components nested one within the other; an outer component which is open at both ends and has its first end presented toward the container and an inner component having an open outlet end and a valved end, said outlet end presented in the same direction as the second end of the outer component with the outer wall of said outlet end in circumferential engagement with the inner wall of the outer component and said valved end defining a normally closed valve yieldingly openable by application of lateral compression through the wall of the outer component.

8. A controllable valve device for use in dispensing a liquid from a container, said device comprising two tubular components nested one within the other and each formed of resilient sheet material, the outer one of said components being normally open at both ends and having its inlet end presented toward the container and its outlet end presented in a direction away from the container, and the inner one of said components having an outlet end normally open and presented in the same direction as the outlet end of the outer com-

ponent, and the inner component having its outer wall in circumferential engagement with the inner wall of the outer component and having an inlet end presented in the same direction as the inlet end of the outer component, and the resilient sheet material of the inner component having surfaces providing a normally closed valve yieldingly openable by application of lateral compression to the inner component through the wall of the outer component.

9. A spill-resistant beverage-dispensing container comprising an upwardly open container, a lid member sealingly engaged with and covering the opening of said container, and a lip-controllable valve device for selectively dispensing a liquid from the container, the valve device comprising two tubular components nested one within the other and each formed of resilient sheet material, the outer one of said components being normally open at both ends and having its inlet end presented toward and communicating through an aperture in the lid member with the interior of the container, the inlet end being sealingly engaged about its perimeter with the perimeter of the lid member aperture, and its outlet end presented in a direction away from the container, and the inner one of said components having an outlet end normally open and sealingly engaged with the outer component in the region of the outer component outlet end, and the inner component having an inlet end presented toward the inlet end of the outer component, and the resilient sheet material of the inlet portion of the inner component having planar terminal portions at opposite sides of the inner component providing a normally closed valve apex yieldingly openable by application lateral compression to the inner component through the wall of the outer component by a user's lips in a direction edgewise to said planar terminal portions providing said valve apex.

10. A closure device for a container of a drinkable liquid, the closure device comprising a lid member, said lid member having an aperture and means for sealingly engaging the lid member with the perimeter of a container opening, a valve device controllable by the lips of the user, the valve device extending upwardly from the lid member and providing for selectively dispensing the liquid from the container, said valve device comprising a tubular component having openings at both ends and having an inlet end presented toward the container with the perimeter of said inlet end sealingly engaged with the lid member about the lid member aperture, the outlet end of said tubular component being presented in a direction away from the container, a valve member is said tubular component between the inlet and outlet ends of said tubular component, said valve being openable and closeable by engagement and disengagement of the lips of the user, and a sealing tab adapted to overly and seal the outlet end of said tubular component, said sealing tab being manually displaceable to open the outlet end of the tubular component.

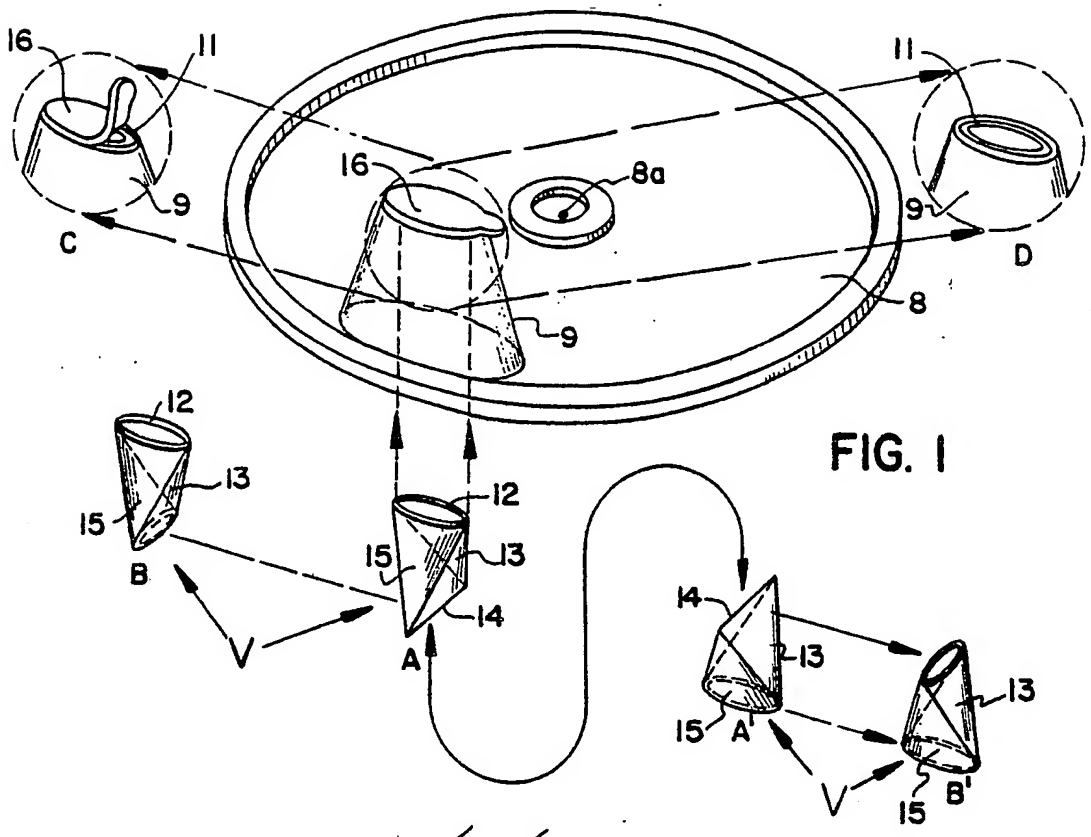
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FIG. 1

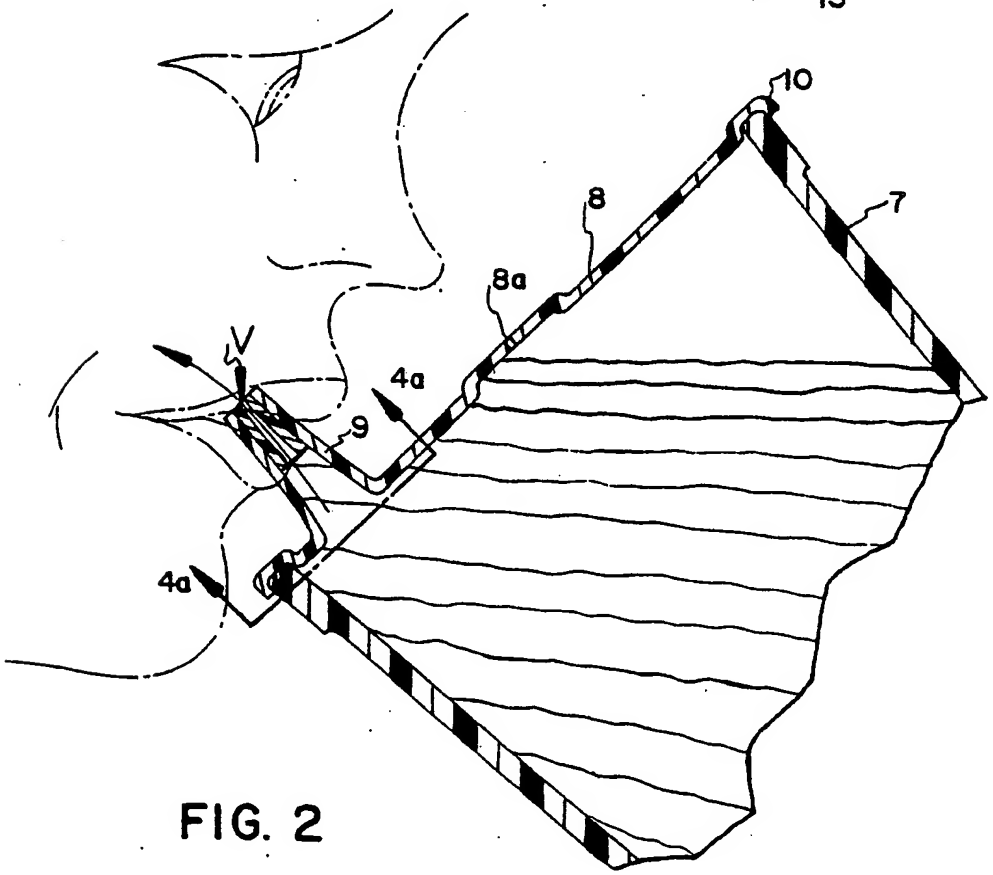
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FIG. 2

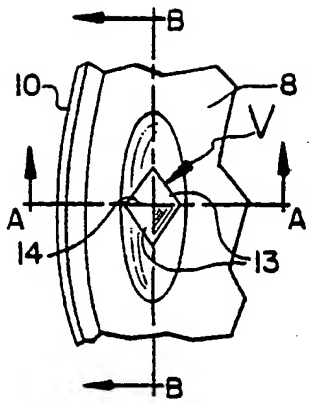


FIG. 3

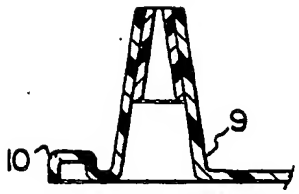


FIG. 3A

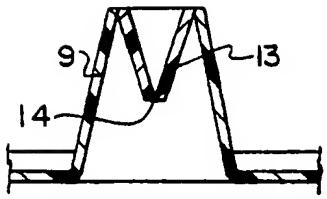


FIG. 3B

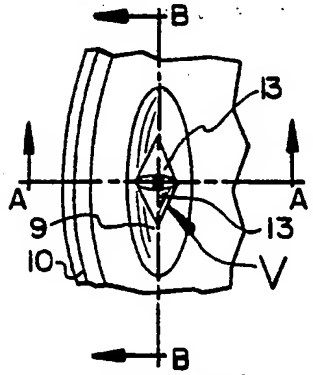


FIG. 4

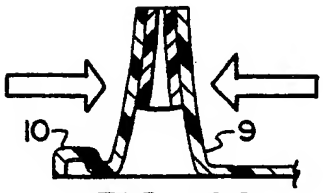


FIG. 4A

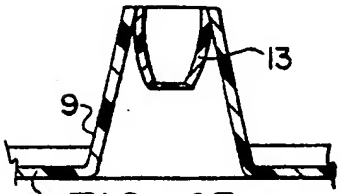


FIG. 4B

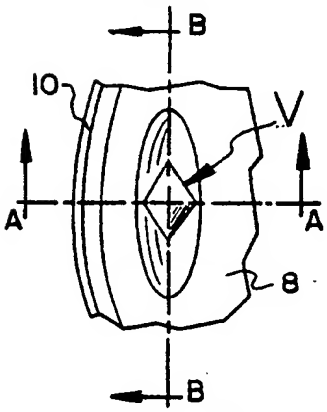


FIG. 5

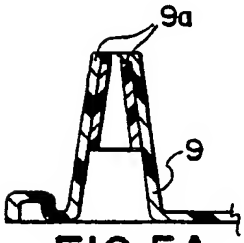


FIG.5A

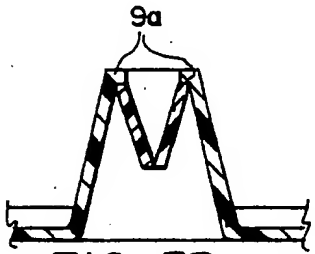


FIG. 5B

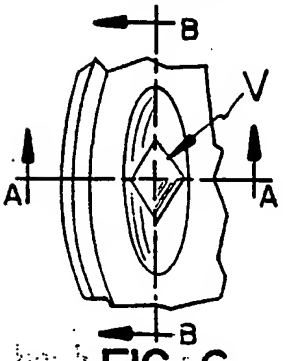


FIG. 6

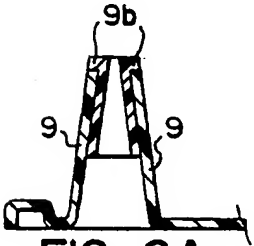


FIG. 6A

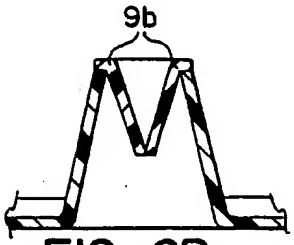


FIG. 6B

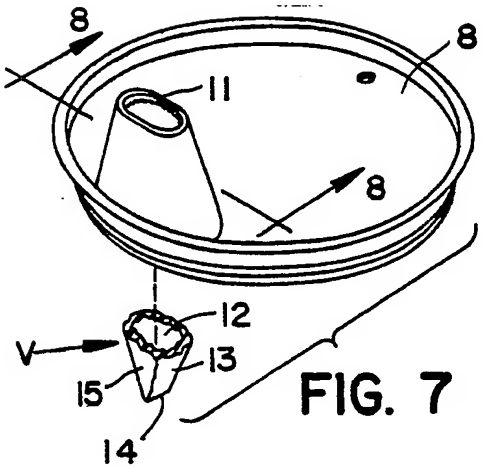
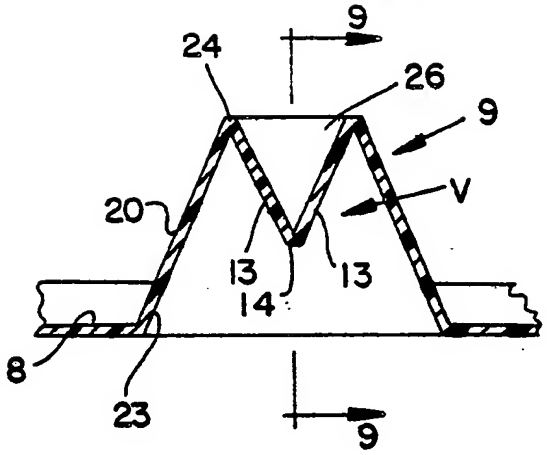


FIG. 7

FIG. 8



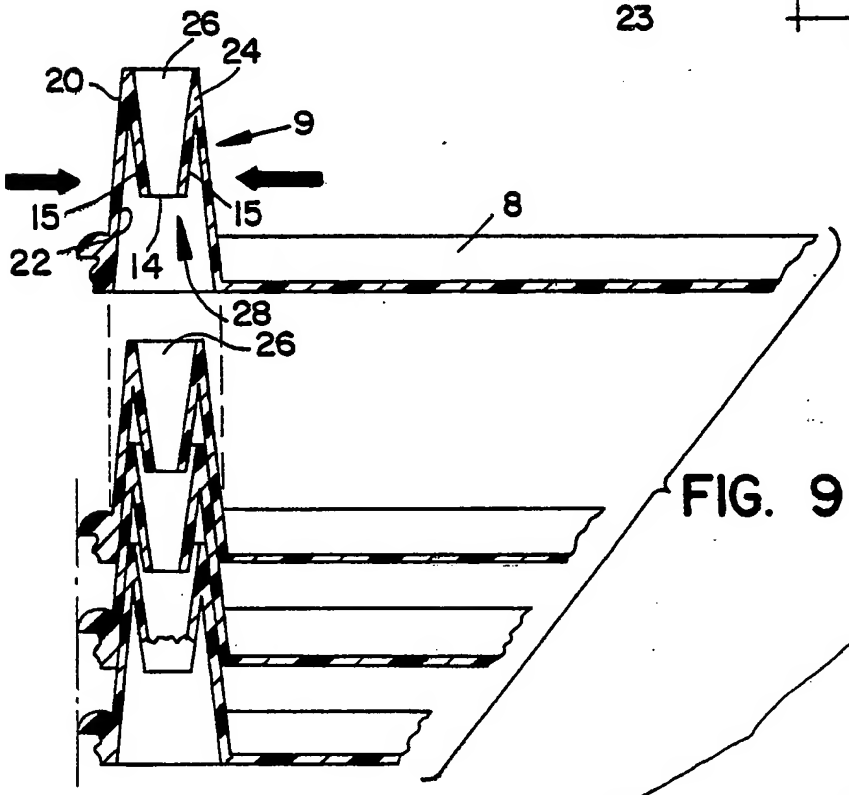


FIG. 9

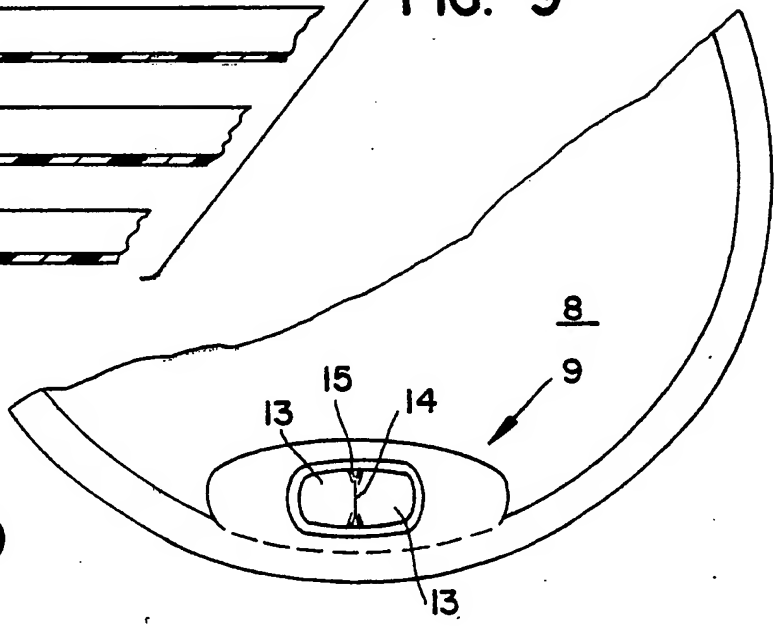


FIG. 10

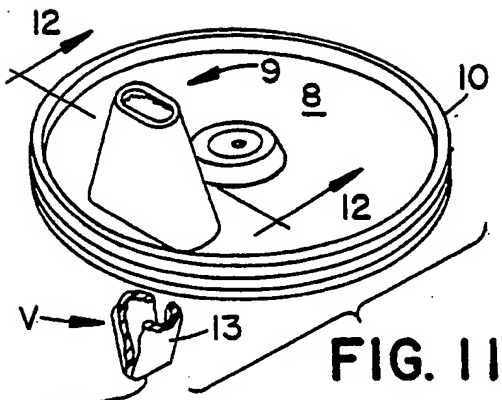
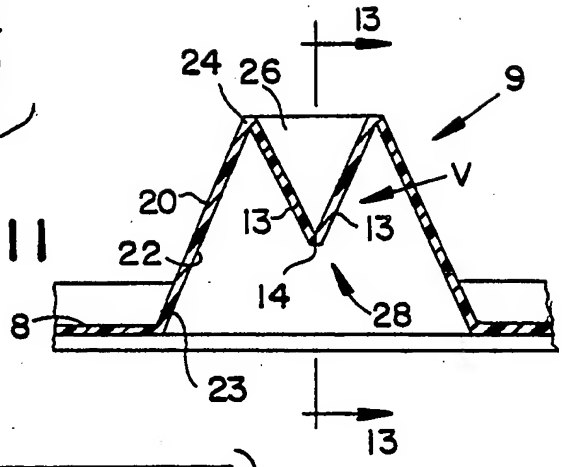


FIG. 11

FIG. 12



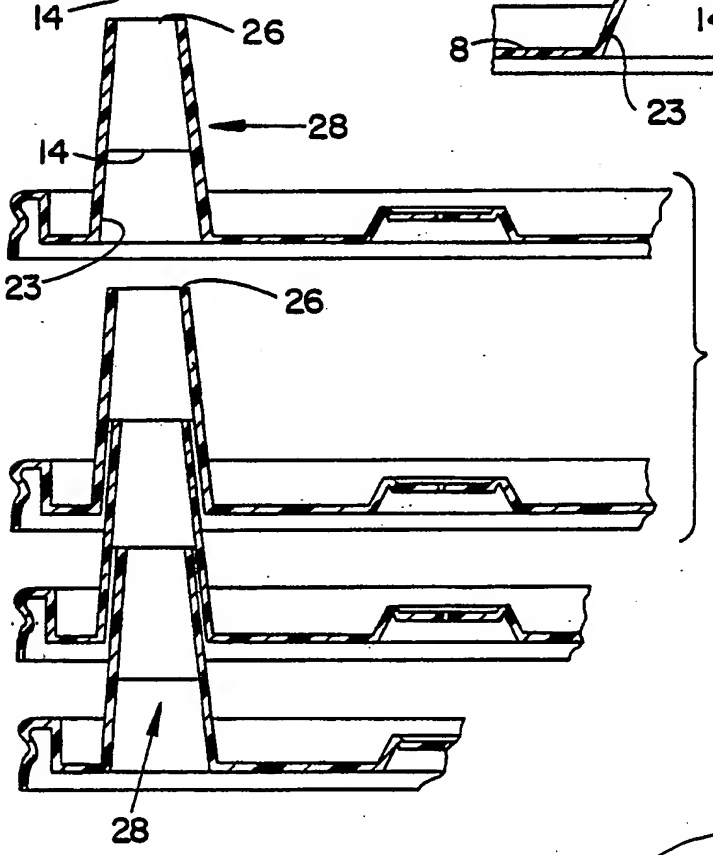


FIG. 13

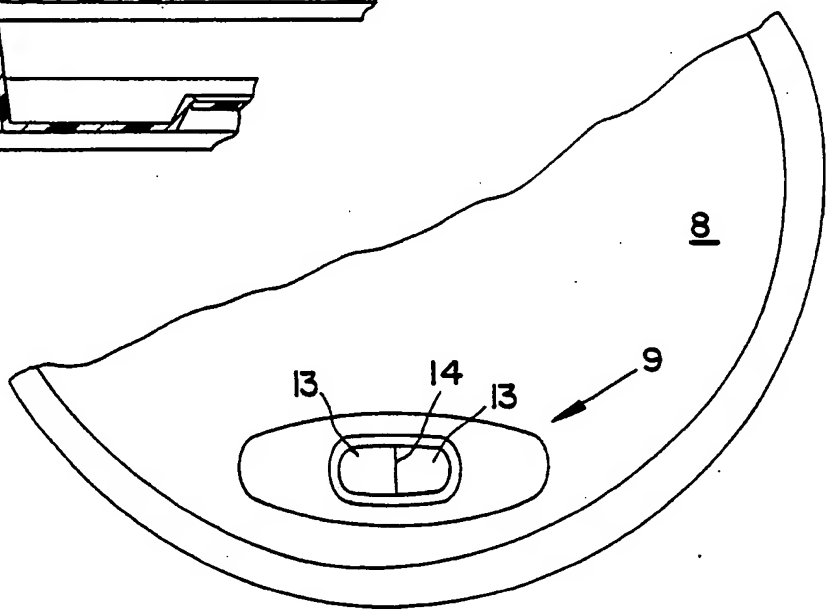


FIG. 14

FIG. 15

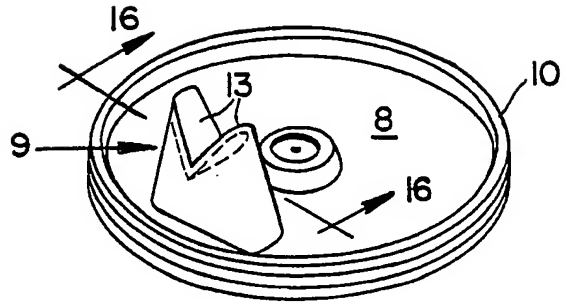
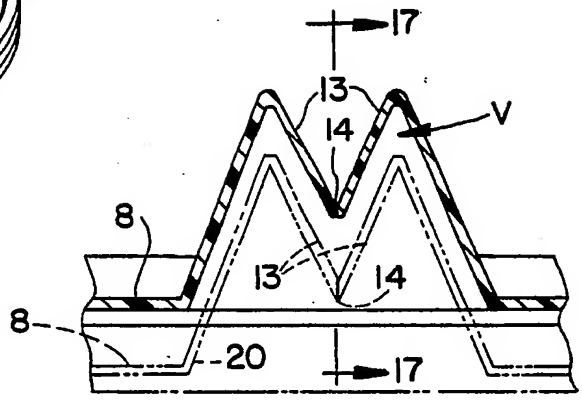


FIG. 16



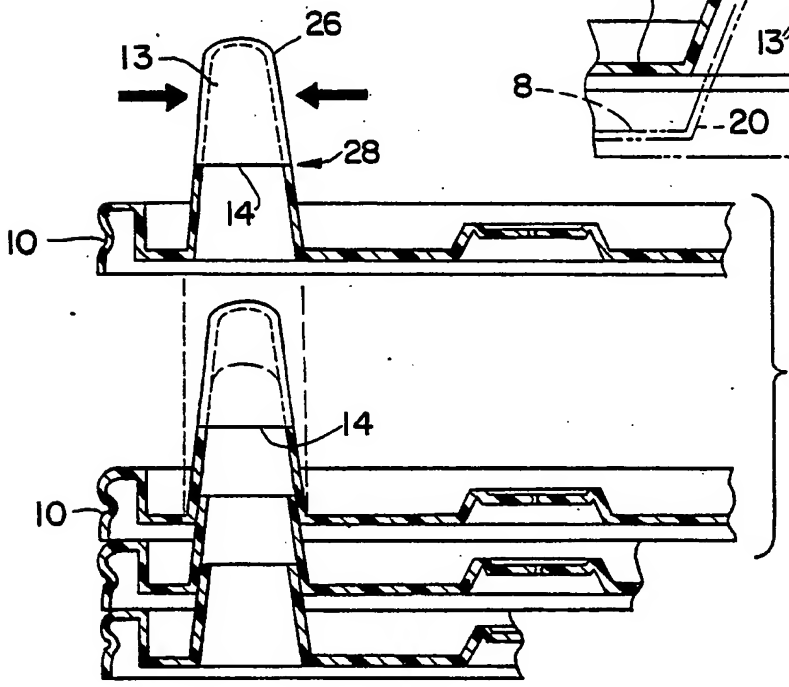


FIG. 17

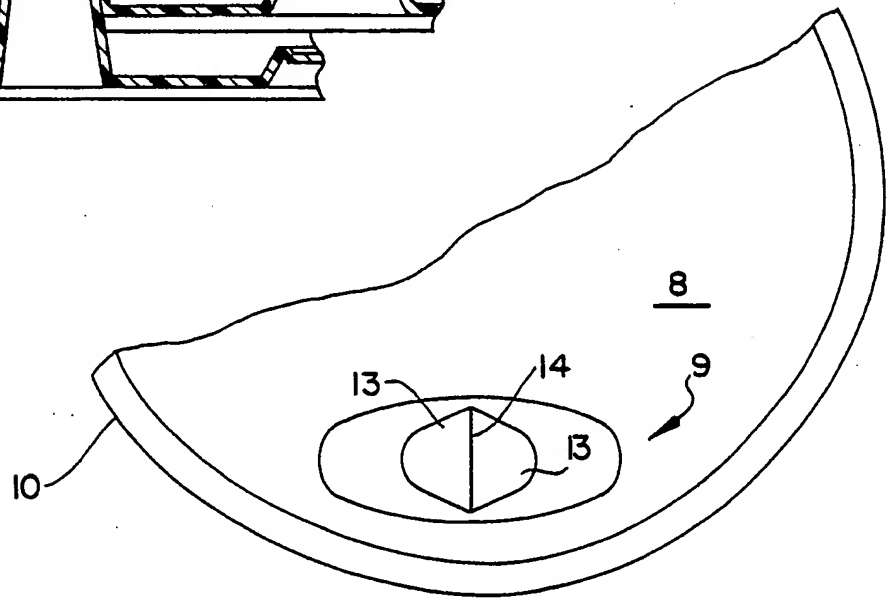


FIG. 18